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Roll No:
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, NOVEMBER - 2011

ME - PRODUCTION ENGINEERING Semester : 3

09PP13 RAPID PROTOTYPING

Time : 3 Hours **Maximum Marks : 100**

INSTRUCTIONS:

1. Answer **ALL** questions from PART - A and Answer any **FOUR questions** from PART - B. Question under PART - C is Compulsory.

PART - A

Marks : 10 x 3 = 30

1. Brief the three phases of prototyping?
2. Why is the rapid prototyping technique more flexible and faster in producing prototypes than that of the traditional manufacturing methods?
3. What is meant by trapped volume? How it affects the accuracy of the SLA process?
4. What is meant by form-then-bond process in adhesive bonding? Mention each one of its advantages and limitations.
5. Mention the principle of LENS process with a sketch.
6. What is meant by 3D printing? List the technical challenges of printing.
7. Mention some of the medical applications of rapid prototyping with examples.
8. What are the applications of magics and mimics softwares?
9. What are the feature constraints that are to be considered while choosing candidate build orientations for the SLA process?
10. What are the steps involved in a vacuum casting process for producing accurate silicon tools for casting parts with fine details and very thin walls?

PART - B

Marks : 4 x 12.5 = 50

11. a) With the help of a flowchart classify the different RP processes according to state of aggregation of their original material. (3.5)

b) Explain the method of building prototypes in FDM process with a neat sketch. Explain in detail how the conventional FDM system can be redesigned into a mobile FDM system for flexible manufacturing applications. (9)

12. a) Discuss the SLS process in detail with sketches. Also name its various process parameters and mention their influence on the performance of the process. (8)

b) Explain the different powder fusion mechanisms that are used in the powder bed fusion processes. (4.5)

13. a) What is meant by a concept modeler? List the various steps involved in 'JP system 5' concept modeler for producing conceptual models. (6)

b) What is meant by STL file? Discuss in detail about the errors that occur in STL files due to the tessellation algorithms used to create it. (6.5)

14. a) Differentiate hard tooling and soft tooling. Discuss in detail how the spray metal deposition tooling technique is used as an indirect rapid tooling method to create moulds. (6)

b) With sketches discuss the rapid tooling process using laser powered direct metallic manufacturing method. Also mention the various process parameters along with their significance on the accuracy of the RT part size and quality. (6.5)

15. a) Explain how the accuracy of RP process is influenced by the data preparation, part building and part finishing errors . Also mention its causes and how it can be eliminated? (6.5)

b) Name the different types of scanning systems and mention its advantages and limitations. Also explain about the following stages in reverse engineering :
(i) Digitising (ii) Data segmentation (iii) Data fitting. (6)

PART - C Marks : 1 x 20 = 20

16. List the various stages involved in the SGC process. Discuss each stage in detail with neat sketches? Also discuss the difference between SLA and SGC process.

/END/

FD/KP

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